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ROTARY CUTTING APPARATUS COMPRISING  
A PLACING SYSTEM FOR THE ORDERLY SORTING OF CUTS

Description

The invention concerns a device for producing blanks using a rotary cutting apparatus, wherein a placing system is disposed downstream of the cutting apparatus for defined sorting of the blanks.

Processing systems for producing card-like blanks from sheets are known in the art. A defined number of items are thereby printed on each sheet, in particular marked or e.g. numbered, as e.g. in the production of playing cards, numbered tickets or blanks with special imprints. These sheets are subsequently collected and stacked and the sheets are individually cut in a longitudinal and transverse direction in an associated appropriate machine. The consecutive rows are subsequently stacked and disposed on top of each other to produce a sorted stack 4. This process is mainly applied for blanks 1 having a rectangular shape and cornered edges.

Blanks with round corners 2 are also produced by printing sheets which, lying on top of each other, are subsequently punched out using lift punching devices. In a further working step, these blanks are then rearranged into sorted stacks 4 in an automatic sorting machine.

There are also conventional machines which provide endless printed paper or product webs instead of printed sheets, which are then guided through a rotary cutting apparatus. The blanks 1, 2 are then sequentially

stacked in rows and are later rearranged into sorted stacks in a sorting machine in a separate working step.

For sheet processing, all associated blanks are advantageously provided on one sheet to be processed. The large number of required processing steps is disadvantageous. The processing of endless printed product webs is advantageous due to the high speed and the possibility to install such machines directly after a printing machine for inline processing. The blanks 1, 2 produced in this manner must disadvantageously be subsequently guided through sorting machines to obtain the required mixtures or sorted stacks 4.

It is the underlying purpose of the invention to produce a rotary processing system for cutting the product web 3, printed during inline or offline operation, in a rotary method, placing the cut blanks 1, 2 over a full surface, receiving and mixing them in a particular device in accordance with a predetermined order to obtain a sorted stack 4 after passage through the entire device.

Another object of this machine is to mix the blanks in accordance with a certain matrix.

Another object of the apparatus is to examine printed endless goods for printing errors and remove these goods in a directed manner or to detect and properly remove whole sections of faulty blanks in the product web. This is advantageously achieved with the machine or device 5 described below.

This object is achieved in accordance with the invention with a device comprising the features of claim 1.

The device 5 comprises a roller 6 onto which the printed product web 3 is disposed. A manual or automatic splice means 7 is advantageously disposed downstream of the machine 5. A side edge control 8 is disposed downstream thereof to exactly position the printed product web 3. A decurling means 9 is used to counteract bending of the product web to compensate for curvatures or bending stress produced by rolling the product web. The pulling station 10 pulls the printed product web 3 from the roller 6 with a predetermined tension. The required tension compensation is regulated or controlled via the compensation system 11 and a brake or drive system. The rotary cutting apparatus 13 consists of a formatted cutting cylinder 14 and a counter pressure cylinder 15. During passage of the printed product web 3 through the rotary cutting apparatus 13, a blank 1, 2 is cut out from the product web 3. A waste strip or waste grid may thereby be produced between the products 1, 2 in the printed product web 3.

In a preferred embodiment, the waste strip or waste grid 16 is guided out of the rotary cutting apparatus 13 together with the blank and taken over by the suction belt means 17. When the blanks 1, 2 have been safely received by the suction belt means 17, the waste strip or the waste grid is separated from the blanks 1, 2 through deflection and pulled into a chopper 18 where it is disintegrated and suctioned off. The blanks 1, 2 are then either spatially separated or, in one variant, disposed next to each other on the suction belt means 17 without intermediate waste. This suction belt means has a superior optical test device 20 to examine the blanks 1, 2 for completeness or faults. The suction belt means 17 also has a downstream suction cup wheel, disposed above the suction belt means, with subsequent suction cup belt. Individual suction cups 22 are disposed on this suction cup belt 21 in accordance with a predetermined matrix. The suction cups 22 have the same mutual separations as the blanks in the product web and move with the same speed as the suction

belt means 17. The suction cups accept one or more rows of blanks using a control means, thereby suctioning and transferring the predetermined number of blanks 1, 2 to the stacking means 23 or any other downstream device.

A predetermined number of sequential blanks are repeatedly taken over by the sequential suction cups 22, transported and transferred to the next stacking means 24. Each stacking means 22-27 has a vacuum wheel 28 and vacuum belts 29. Each transferred blank 1, 2 is transferred to one track of the delivery wheel 30 using the vacuum wheel 28 and the vacuum belts 29. The delivery wheel 30 may be designed as vacuum drum or delivery star. The delivery wheel 30 must have different diameters in each track for placing the cards from each row at different levels in the delivery nest 31. When all blanks 1, 2 have been placed at different levels in the delivery nest 31 using the delivery wheel 30, the individual nest layers are pushed on top of each other by displacing the delivery nest 31 against the lateral stop 32, and the blanks are disposed on top of each other in a sorted stack 4. Sorting is achieved in that the blanks 1, 2 are printed one after the other in the printed product web in a predetermined order, and are then placed and stacked on top of each other at different levels using the delivery wheel 30 and the delivery nest 31.

The sorted stack 4 is pushed onto a transport belt 34 using a further pushing device 33, from where it is guided out of the machine to a conventional packaging system. Faulty blanks are transferred to the suctioning means 36 at the suction cup wheel 35 and transferred to a waste means. With particular advantage, different blank rows are taken over depending on the control of the suction cups 22 and each row is supplied to one of the stacking means 23 to 27, where they can be placed.

This permits arbitrary sorting. In one embodiment (not shown), each individual suction cup can moreover be controlled directly e.g. via a bus system. This permits individual different distribution of transferred blank 1, 2 rows to several stacking means 23 through 27.

Depending on the design, any number of suction cups 22 can advantageously be disposed and mounted at different separations on the suction cup belt 21.

Another advantage is that any number of stacking means 23 can be disposed one after another, as required.

List of Reference Numerals:

1. cornered blanks
2. blanks with round corners
3. printed product web
4. sorted stack
5. machine
6. roller
7. splice means
8. side edge control
9. decurling means
10. pulling station
11. delivery system
12. brake and/or drive system
13. rotary cutting apparatus
14. cutting cylinder
15. counter pressure cylinder
16. waste strip/waste grid
17. suction belt means
18. chopper
19. pressure mark control
20. optical test device
21. suction cup belt
22. suction cups
23. stacking means
24. stacking means
25. stacking means
26. stacking means
27. stacking means
28. vacuum wheel
29. vacuum belts

- 30. delivery wheel (vacuum drum or delivery system)
- 31. delivery nest
- 32. stop
- 33. pushing device
- 34. transport belt
- 35. suction cup wheel
- 36. suctioning means
- 37. suction funnel